

AMENDMENT

Please enter the following amendments:

IN THE CLAIMS

Cancel claims 1-15 without prejudice or disclaimer.

Please add new claims 16-35 as follows:

16. A reactor comprising:

a catalyst structure comprising a porous support and a porous interfacial layer disposed on the porous structure, wherein the porous structure has a first pore size of at least 0.1 μm , wherein the porous interfacial layer has a second pore size less than the first pore size; and

a microchannel;

wherein the catalyst structure is disposed in the microchannel.

17. The reactor of claim 16 comprising:

a reaction chamber wall, wherein the reaction chamber wall is a wall of a microchannel; and
a cooling chamber;

wherein the catalyst structure is disposed in said microchannel, and wherein said reaction chamber wall separates the catalyst structure from the cooling chamber.

18. The reactor of claim 17 wherein the porous structure is a coherent structure; and

wherein the catalyst structure comprises a Fischer-Tropsch catalyst selected from the group consisting of cobalt, ruthenium, iron, rhodium, osmium and combinations thereof.

19. The reactor of claim 18 wherein the first pore size ranges from 10 μm to 300 μm .
20. The reactor of claim 16 wherein the porous structure is a coherent structure; and wherein the first pore size ranges from 10 μm to 300 μm .
21. The reactor of claim 16 wherein the porous structure comprises a metal foam having pores that range from 20 pores per inch to 1000 pores per inch.
22. The reactor of claim 17 wherein the porous support comprises a metal foam, felt or wad.
23. The reactor of claim 16 further comprising a catalyst layer deposited on the interfacial layer.
24. The reactor of claim 17 further comprising a catalyst layer deposited on the interfacial layer.
25. The reactor of claim 24 wherein the porous structure comprises a metal foam having pores that range from 20 pores per inch to 1000 pores per inch.
26. The reactor of claim 16 wherein the interfacial layer is continuous over the porous substrate.

27. The reactor of claim 23 wherein the interfacial layer is continuous over the porous substrate.

28. The reactor of claim 16 wherein the porous structure comprises a foam, felt or wad.

29. The reactor of claim 17 wherein the porous structure comprises a foam, felt or wad.

30. The reactor of claim 16 wherein the catalyst structure has a pore volume of greater than 30%.

31. The reactor of claim 29 wherein the interfacial layer is selected from the group consisting of:
 γ -Al₂O₃, SiO₂, ZrO₂, TiO₂, magnesium oxide, vanadium oxide, chromium oxide, manganese oxide, iron oxide, nickel oxide, cobalt oxide, copper oxide, zinc oxide, molybdenum oxide, tin oxide, calcium oxide, aluminum oxide, lanthanum series oxide(s), zeolite(s), and combinations thereof.

32. The reactor of claim 16 wherein the interfacial layer is selected from the group consisting of:
 γ -Al₂O₃, SiO₂, ZrO₂, TiO₂, magnesium oxide, vanadium oxide, chromium oxide, manganese oxide, iron oxide, nickel oxide, cobalt oxide, copper oxide, zinc oxide, molybdenum oxide, tin oxide, calcium oxide, aluminum oxide, lanthanum series oxide(s), zeolite(s), and combinations thereof.

33. The reactor of claim 32 wherein the porous support is a metal that has been etched with acid prior to applying the interfacial layer.

34. A catalyst structure comprising a porous support and a porous interfacial layer disposed on the porous structure, wherein the porous structure has a first pore size of at least 0.1 μm , wherein the porous interfacial layer has a second pore size less than the first pore size;

wherein the catalyst structure has a porosity of greater than 30%;

wherein the porous structure comprises a foam, felt, wad or combination thereof;

wherein the catalyst structure has performance such that when the catalyst structure is heated to at least 200°C and a feed stream comprising CO and H₂ are passed through the catalyst structure,

wherein the feed stream has a residence time in the reactor of less than five seconds; and

wherein a product stream is obtained that exhibits the properties of at least a 25% conversion of carbon monoxide and at most 25% selectivity toward methane.

35. The catalyst structure of claim 34 wherein the porous support is metal;

wherein the first pore size ranges from 10 μm to 300 μm ; and

wherein the interfacial layer has a thickness less than 20 μm .